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ABSTRACT

Contingency contracting has been demonstrated to be an effective procedure for achieving weight loss. A problem with this type of contract is that the S may have to permanently forfeit an item for a failure to lose weight when in fact his/her eating behavior has been appropriate. The following procedure was developed to overcome this problem. A projected weight loss line (PWL) and a deviation line (DL) were drawn on a graph. At any deadline when the S's weight was above the PWL, the subject was temporarily denied access to an item until the next weigh-in when the S's weight fell on or below the PWL. On any deadline when the S's weight fell above the DL, the S permanently forfeited one reinforcer for every pound above the DL. Two female Ss participated in the program. A reversal design demonstrated the effectiveness of these procedures. (Author/CKJ)

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THE USE OF A DEVIATION LINE IN CONTINGENCY CONTRACTING FOR WEIGHT CONTROL

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Contingency contracting has been demonstrated to be an effective procedure for achieving weight loss. Using this approach, the S generally contracts to lose x amount of weight by each of a series of deadlines which usually occur at one or two week intervals. Typically the S turns over a number of reinforcers to E. One of these is either returned to the S or permanently forfeited at each deadline depending upon whether or not the S lost the contracted amount of weight. A problem with this type of contract is that the S may have to permanently forfeit an item for a failure to lose weight when in fact his/her eating behavior has been appropriate. This problem may occur under conditions such as constipation, water retention associated with menstruation, or other physiological causes. The following procedure was developed to overcome this problem. A projected weight loss line (PWL) was drawn on a graph starting with the S's initial weight and reflecting an x pound per week weight loss. A deviation line (DL) was drawn parallel to the PWL, but several pounds above it. At any deadline when the S's weight was above the PWL, the subject was temporarily denied access to an item, e.g. a washing machine, or a dishwasher, that resulted in a minor inconvenience to them. Access to this item was denied the S until the next weigh-in when the S's weight fell on or below the PWL. On any deadline when the S's weight fell above the DL, the S permanently forfeited one reinforcer for every pound above the DL. Two female Ss participated in the program. A reversal design demonstrated the effectiveness of these procedures.

THE USE OF A DEVIATION LINE IN CONTINGENCY CONTRACTING FOR WEIGHT CONTROL

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Contingency contracting has been demonstrated to be an effective procedure for achieving weight loss. Using this approach, the client generally contracts to lose x amount of weight by each of a series of deadlines which usually occur at one or two week intervals. In a typical case, the client turns over a number of valued items or money to the therapist. One of these items or a specified amount of money is either returned to the client or permanently forfeited at each deadline depending upon whether or not the client lost the contracted amount of weight (e.g., Harris and Bruner, 1971, Jeffrey and Christensen, 1972, Mann, 1972).

One of the presumed attributes of contracting is that it makes explicit what behavior each party is to engage in and the consequences that will follow. Therapists working with weight reduction problems, however, have been reluctant to deal directly with eating behavior because of the difficulty in monitoring it. They have preferred to monitor the results of eating behavior, namely weight loss or gain and have made the tacit assumption that weight gain or loss is the direct result of eating behavior. Unfortunately, in the short term this assumption may not be valid and, in the contract situation, may lead to two kinds of problems:

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[1]Senior authorship was determined by a flip of a coin. Both authors contributed equally to this study. The authors wish to thank Roger Schnaitter for his comments on an early draft of this paper.

1. The first is that of reinforcing the client when deviant behavior has preceded the weigh-in when, in fact, the deviant behavior has primarily been responsible for the weight loss. Mann (1972) lists extreme measures reported by his subjects such as taking laxatives, diuretics, and doing vigorous exercises just before being weighed. Our own experience would add such temporary weight loss techniques as prolonged spitting, abstaining from liquid intake, drinking alcohol 12 hours before weigh-in in an attempt to dehydrate the body, wearing light weight and brief clothing to the weigh-in and fasting.
2. A second problem can occur when the therapist punishes the client (by destroying valued items) or fails to reinforce his behavior (by returning items) because the required weight loss did not materialize even though the client engaged in appropriate caloric intake. Such circumstances might occur when processes not in the client's immediate control offset the client's weight loss as, for example, in the event of constipation, water retention during menstruation, or fluid retention due to a variety of other physiological causes (Bortz, 1968).

Occasional forfeiture of highly valued items, in spite of appropriate eating behavior, may be considered one of the unfortunate side effects of a program with strict, well-defined contingencies. One way of avoiding this side effect, however, would involve the <u>temporary</u> forfeiture of items. When the failure to lose weight is only temporary and a sig-

nificant weight gain does not occur, temporary loss of a convenience item might serve as an effective consequence. Since the convenience item could be returned when the client's weight was back on target, the client would suffer no permanent loss for a failure to lose weight when it was beyond his control. Yet immediate consequences would take place for the failure to meet the weekly goal. The conditions under which convenience items could be used to consequate minor lapses in weight loss progress is the subject of this study.

METHOD

Subjects: The subjects were two married women with long histories of being overweight. The first subject was 36 years old, weighed 180 pounds, and was approximately 56 pounds overweight.[1] The second subject was 32 years old, weighed 156 pounds and was approximately 26 pounds overweight.[1] Both women had contacted us after learning of our interest in weight control and asked to participate in any program that we might be conducting. Each subject was required to obtain a signed statement from her physician indicating: 1) an appropriate terminal weight, 2) the maximum weekly weight loss that would be appropriate for them, and 3) that there was no medical reason why the subject could not participate in a weight reduction program.

Contract: After reading the contract and discussing its terms, each subject deposited with the researchers a number of items that were of personal value, e.g., books, pottery, antique plates, paintings, etc. In addition each subject provided the researchers with a list of items that would cause

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[1]Using the Metropolitan Life Insurance Standards for a medium frame.

some inconvenience if they were not available for use. These lists included such items as a dishwasher, vacuum cleaner, washing machine, the kitchen stove and a garage door opener. All of these items were either small enough that they could be brought to the researchers, or an essential component of the item could be brought in, e.g. the elements for the electric kitchen stove or the agitator for the washing machine.

Each subject then signed a contract which stipulated that:

1) A projected weight loss line (PWL) would be drawn on a graph with a slope indicating one pound per week weight loss. This is the thin solid line in Figures 1 and 2.

2) A deviation line (DL) would be drawn parallel to the PWL, but two pounds above it. This is the dotted line in Figures 1 and 2.

3) At any weekly weigh-in when the subject's weight was above the PWL, the subject would temporarily forfeit one item that would inconvenience her, and this item would remain with the researchers until the next weigh-in when the subject's weight fell below the PWL. Failure to bring in the required item (or an essential component of it), would result in the permanent forfeiture of one of the valued items already held by the researchers.

4) On any weigh-in when the subject's weight was above the DL, the subject would permanently forfeit one item, randomly selected by the researchers, for every pound that their weight was above the DL. All items were either destroyed in the presence of the subject, or disposed of in a manner agreed to by the subject, with the stipulation it did not bring any benefit to the researchers.

5) On the second consecutive weigh-in, when the subject's weight was above the DL, the subject forfeited another permanent item and both the PWL and DL lines would be redrawn with the PWL origin being the subject's current weight.

6) Subjects were told that all items in the possession of the researchers would be forfeited should they drop out of the program prior to its completion unless a signed statement from a physician was presented indicating that it was no longer appropriate for the subject to continue. Upon completion of the program, all items not forfeited during the course of the program would be returned to the participant.

7) The contract was in effect until a predetermined date, (approximately four months in the future) or until the subject reached her goal weight, which ever came first. The goal weight was determined by the subject at the start of the program, but within the limit set by her physician.

Measurement: The contract specified that the subject be weighed at a specific time and place each week. Subjects were weighed on a Continental balance scale of the kind typically employed in medical settings. Weights were read to the nearest 1/4 pound by both the subject and the researchers, and there was 100% agreement throughout the entire experiment.

Procedures: An ABAB single subject replication design (cf., Baer, Wolf, and Risley, 1968) was employed. This included the sequence of a baseline assessment of the subject's weight, a treatment (contract) period, a reversal, and the reinstatement of treatment.

The subject's weight was measured weekly during baseline until the stability of the subject's weight had been established. Subjects were not aware of the criterion for entering into the treatment phase of the experiment. The baseline period required was three weeks for one subject and four for the other. During the baseline period, the subjects had not signed their contracts, but were aware of the treatment plan and were in the process of identifying reinforcers for use in the program.

During the treatment condition, the contract was in effect. In addition, the subjects were asked to keep records of the amount and type of food consumed, the number of calories for each food item, when the food was consumed, where it was consumed, with whom it was consumed, what they were doing during its consumption, and their emotional state at the time of consumption. For the first eight weeks of treatment, the Experimenters spent approximately 1/2 hour following each weigh-in instructing the subjects in the use of self control procedures (Stuart, 1967, Stuart & Davis, 1972). On each occasion, they were given specific suggestions for changing their eating behavior during the coming week. After the first eight weeks, the researchers spent a few minutes with each subject following the weigh-in reinforcing the subject's weight loss and, on occasion, making suggestions to help the subject deal with specific eating behavior problems.

Following four months of treatment, the contract automatically terminated and the reversal phase of the experiment began. During the reversal phase (which coincided with the summer vacation of the University), the subjects were told that the experimenters would not be available and no weigh-ins would be conducted. Subjects were told to continue engaging

in their self control behavior, and in the fall term they would have the opportunity to enter into another contract if they desired.

In the second treatment phase, the contracts were reinstated exactly as they were during the first phase of treatment. This condition differed from the first treatment phase only in that there was not a systematic presentation of self-control procedures. However, subjects were encouraged to use the self-control procedures that they had learned previously. They were reinforced verbally for weight loss and, when necessary there was discussion of eating behavior problems immediately following each weekly weigh-in.

RESULTS

The results for Subjects 1 and 2 are presented in Figures 1 and 2, respectively. The PWL is represented by the thin solid line; the DL by the dotted line. The subject's actual weight is shown by the thick solid line. The triangles represent points above the DL where Subject 2 permanently forfeited an item. At each point above the PWL but on or below the DL, Subject 2 temporarily lost an item.

It may be seen in Figures 1 and 2 that a treatment effect was obtained for both subjects. In each case there was a stable or increasing baseline prior to the implementation of the treatment program, followed by weight loss during the first treatment condition. Both subjects gained weight during the reversal condition, and following the reinstatement of treatment, reduced their weights to points below that attained during the first treatment phase.

As evident in Figure 1, Subject 1 completed the experiment without ever being consequated for failure to remain below the PWL. On the

other hand, Subject 2 temporarily gave up convenience items on a number of occasions and was required to forfeit four of her permanent items. In Figure 2, Point A represents the place where the PWL and DL were redrawn for Subject 2 to reflect a 1/2 pound rather than a 1 pound weekly weight loss. This change was made because, according to the subject's self report data, she was having to eat less than 500 calories per day in order to achieve her weekly goals. This change seemed appropriate because of the difficulty she was having eating these few calories and also maintaining a balanced diet at this level of caloric intake (Stuart & Davis, 1972).

Consistent with the contract requirement that the PWL and DL lines be redrawn on the second consecutive weigh-in when the subject's weight was above the DL, these lines were redrawn (Figure 2) with the subject's current weight on that date as the origin at point B.

DISCUSSION

In recent years the standard of using the least restrictive alternative therapeutic technique has been increasingly applied to the treatment of mental patients (Stepleton, 1975). The application of this doctrine can easily be extended to function as a guide line for contingency contracting for weight loss as well. The temporary restriction of using a valued item would seem to be considerably less restrictive than its permanent loss. To the extent that this is the case, the therapist is on safer ethical and legal grounds in employing the procedures used in this study than in using those employing the permanent forfeiture of valued items. Consistent with this arguement, if forfeiture of convenience items were shown to be effective by themselves, this strategy would be even more desirable.

When the forfeiture of valuables due to conditions beyond the control of the subject, i.e., menstruation, constipation, etc., is conceptualized as an undesirable side effect of treatment, the procedures used in this study may be seen as reducing the magnitude of such side effects from what might occur with procedures involving only the loss of permanent items. As in the case of medical treatment, it is in the best interest of the client and ultimately the practitioner to consider the potential for undesirable side effects in selecting a treatment procedure. From this vantage point, the procedures employed in this study would seem to be preferable to those that can only result in the permanent loss of items for a failure to achieve a weight loss goal.

There also exists the question of the therapist's legal liability should he later be sued by a disgruntled client for the destruction of invaluable personal items. The monitary award by a court is likely to be much greater for the destruction of an invaluable item of sentimental value than for the loss of using a washing machine for a week (Bowers, 1973).

Not only are the potential ethical and legal problems associated with contracting reduced with the use of temporary forfeiture, but the use of this approach may ultimately prove to be more effective than approaches involving the permanent loss of items. Valued, but seldom used items have little stimulus value for the client while in the custody of the therapist. The temporary loss of a frequently used item like a stove or dishwasher, however, makes contact with the client daily and may function as a strong discriminative stimulus for appropriate eating behavior, i.e., the absence of an item may set the occasion for emitting appropriate eating behavior which will be reinforced by its return.

Consistent with the results of Harris and Bruner (1971) and Mann

(1972), and others, the effects of our treatment were reversed with the abrupt removal of the treatment procedures. While this reversal demonstrated that there was a treatment effect, it also demonstrated that these procedures alone have little long term effect. This is true ever though the subjects in this experiment were ostensibly trained in the use of self control procedures.

In summary, while the procedures employed in this study do not eliminate the possibility that an individual will be consequated when it is undeserved by his eating behavior, they do reduce the permanence of the negative consequences for failing to attain the weight loss goal and hence are preferable to procedures involving only the permanent loss of items on both ethical and legal grounds.

Figure 1. A record of the weight of Subject 1. The projected weight loss line (PWL) is represented by the thin solid line; the deviation line (DL) by the dotted line. The subject's actual weight is shown by the thick solid line.

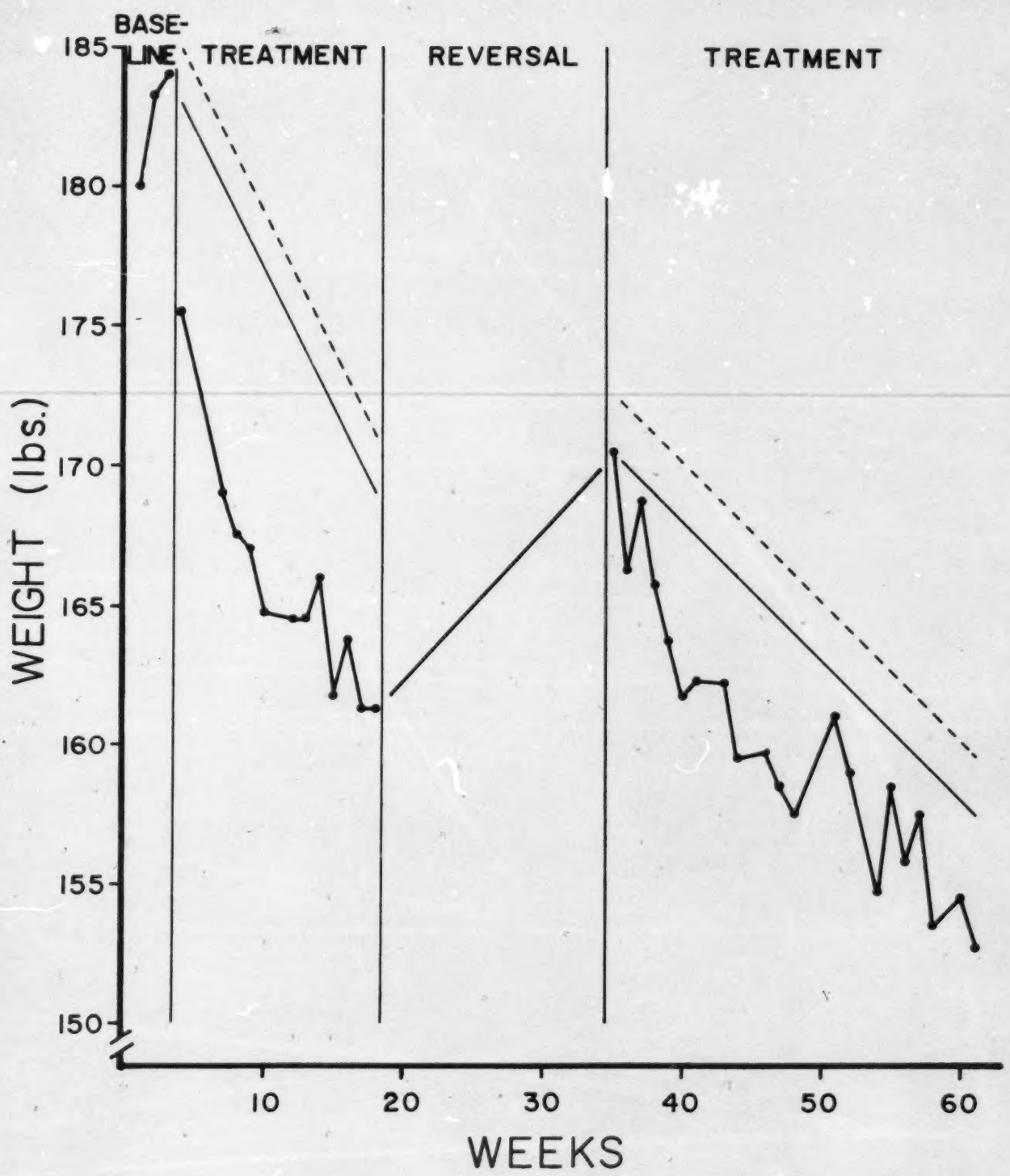
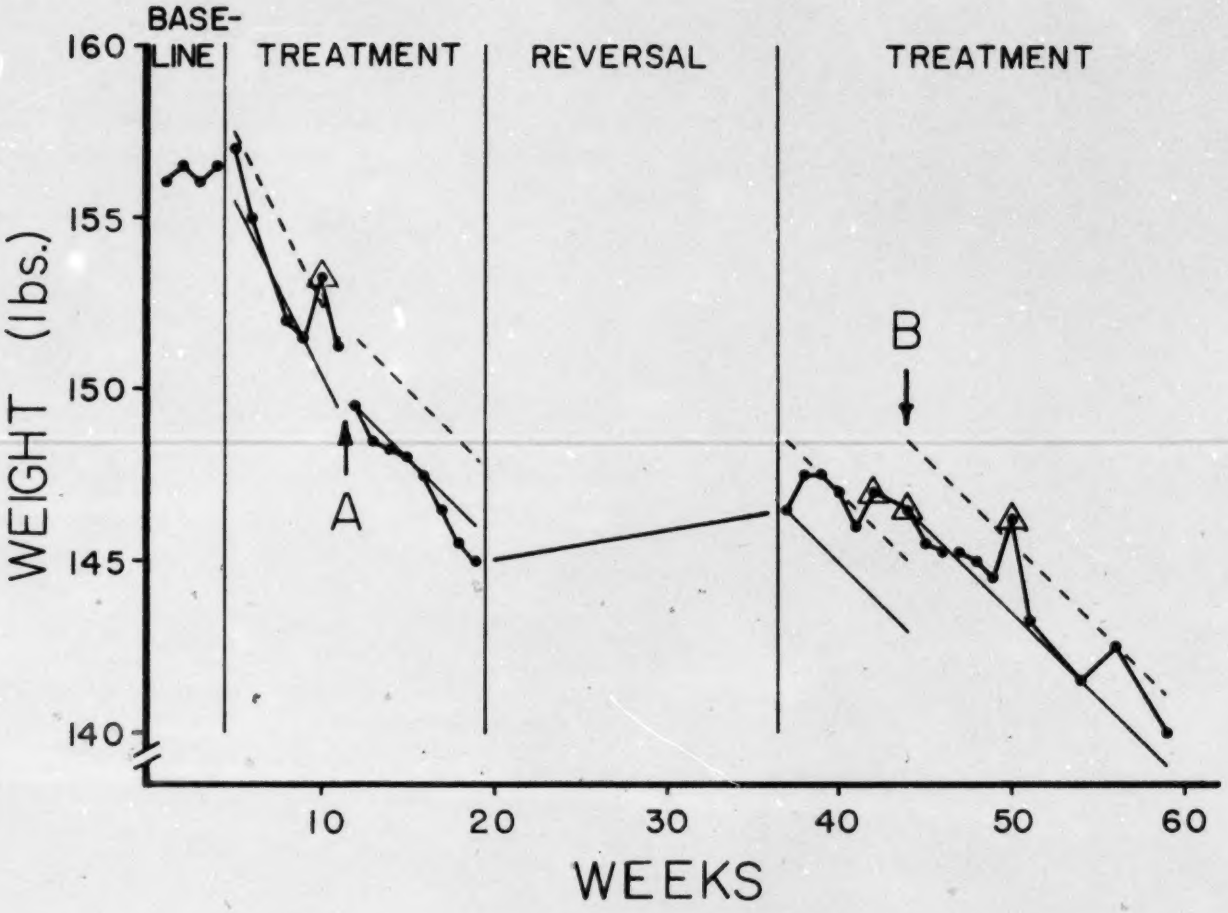

BASE-
LINE
TREATMENT
REVERSAL
TREATMENT
185
180
175
170
165
160
155
150
WEIGHT (lbs.)
10
20
30
40
50
60
WEEKS

Figure 2. A record of the weight of Subject 2. The projected weight loss line (PWL) is represented by the thin solid line; the deviation line (DL) by the dotted line. The subject's actual weight is shown by the thick solid line. The triangles represent points above the DL where the subject permanently forfeited an item. At point A the PWL and DL were redrawn to reflect a 1/2 pound rather than a 1 pound weekly weight loss. Point B indicates where the PWL and DL were redrawn after the second consecutive weigh-in when the subject's weight was above the DL.


BASE-
LINE
TREATMENT
REVERSAL
TREATMENT
160
155
150
145
140
WEIGHT (lbs.)
A
B
10
20
30
40
50
60
WEEKS

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